

# Dermcidin: A Novel Biomarker in Breast Cancer

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GE Zentner

Improved diagnostic screening has been a boon for cancer treatment, and in particular has decreased breast cancer mortality. Screening methods in use include physical examination, ultrasound, and mammography. These techniques are effective at detecting slow-growing cancers, but often miss aggressive breast cancer in its early stages. Recent work indicates that blood-borne tumor biomarkers may provide a means to detect changes in breast epithelium or the tumor microenvironment. To screen for serum biomarkers reflective of breast cancer progression, graduate student Heather Ann Brauer and colleagues in the laboratory of Dr. Paul Lampe (Public Health Sciences Division) undertook a mass spectrometry study of serum samples isolated from a rat model of breast cancer.

To identify potential serum biomarkers for breast cancer progression, serum was collected from rats at 2, 3, 4, 5, and 9 weeks after treatment with N-methylnitrosourea (NMU), a potent carcinogen. Mass spectrometry analysis revealed that the most significantly upregulated serum peptide was dermcidin (DCD).

The authors next measured DCD levels in serum from breast cancer patients and healthy controls. At the time of diagnosis, breast cancer patients showed significantly higher serum DCD than controls. The researchers next compared gene expression profiles from human breast cancer samples to a previously determined signature of gene expression induced by DCD overexpression in the HuH7 hepatocellular carcinoma cell line. Strikingly, the DCD signature was more likely to be positively correlated with aggressive basal-like/triple-negative cancers but negatively correlated with luminal-like cancers. After adjustment for standard clinical variables, correlation with the DCD expression signature was a significant predictor for overall breast cancer survival: those patients with a positive correlation to the DCD signature showed significantly shorter survival than those with a negative correlation.

The finding that DCD levels are highly correlated with a hard-to-detect and aggressive breast cancer subtype suggests that serum screening for DCD levels may be a viable option for disease detection. DCD contains both an antimicrobial peptide and a peptide that supports cell survival. Furthermore, DCD can induce changes in gene expression that may influence cell

proliferation and subsequent tumor formation and progression. These findings both establish DCD levels as a biomarker for aggressive breast cancer and suggest that DCD overexpression may play a role in the progression of aggressive breast cancer. Further studies will undoubtedly expand on both the utility of DCD as a breast cancer biomarker and its role in tumor progression.

[Brauer HA, D'Arcy M, Libby TE, Thompson HJ, Yasui YY, Hamajima N, Li CI, Troester MA, Lampe PD](#). 2014. Dermcidin expression is associated with disease progression and survival among breast cancer patients. *Breast Cancer Res Treat* 144(2):299-306.

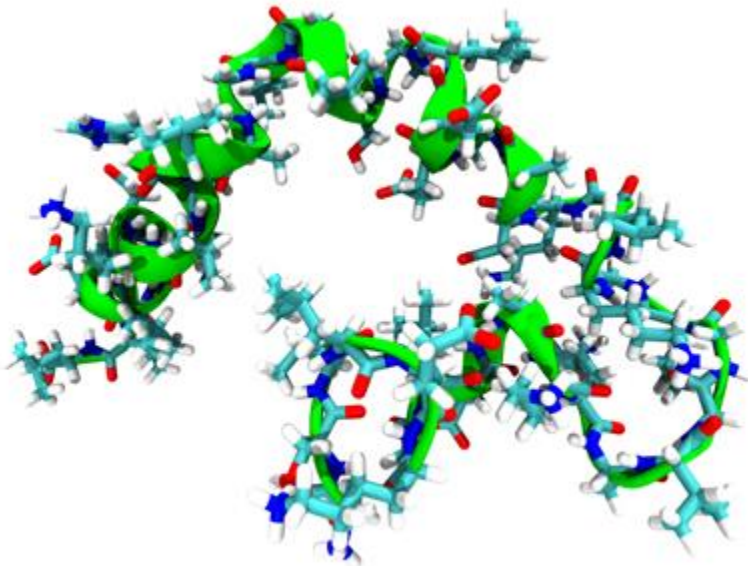


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Solution structure of dermcidin.